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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/611,549

06/30/2003

J. Christopher Matayabas JR.

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03/07/2005

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EXAMINER

HA, NATHAN W

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 03/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/611,549

Applicant(s)

MATAYABAS ET AL.

Examiner

Nathan W. Ha

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 December 2004.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6, 9-16, 19 and 38-51 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 9-16, 19, and 38-51 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Cancellation of claims 7-8 and 17-18 is acknowledged.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-3, 5, 10-13, 15, 38-39, 41, and 44-47 are rejected under 35 U.S.C. 102(b) as being anticipated by LoBianco et al. (US 6,340,846, previously cited, hereinafter, LoBianco.)

In regard to claims 1, 10, 38, and 44, in fig. 7, LoBianco discloses an apparatus comprising:

a die 14 or 16 mounted on a substrate 20, the die being connected to the substrate by a plurality of wires 38; see also, col. 4, lines 55-57; and

a mold cap 60 encapsulating the die and the plurality of wires, the mold cap comprising an electrically insulating portion 64 encapsulating substantially all the wires and the die, and a thermally conductive portion, part of the mold 60, encapsulating substantially all the electrically insulating portion. See also col. 5, lines 25-35.

LoBianco further discloses that the dies are stack of dies, 14 and 16, mounted on the substrate. See also, fig. 7.

In regard to claims 2, 11, and 45, the die inherently comprises IC circuits. The term die means IC die, Integrated Circuit die, or memory die. See col. 4, line 19.

In regard to claims 3, 13, 15, and 39, 47, LoBianco further discloses that the electrically insulating material is a curable resin. See col. 5, lines 59-61.

In regard to claims 5, 41, the mold body 60 is plastic; plastic is a curable material. See also col. 5, lines 25-26.

In regard to claims 12 and 46, the die 14 is a flip-chip since the bottom surface is a non-active surface that is attached to the substrate through adhesive 13. See also, fig. 7 and col. 3, lines 50-54.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 4, 6, 9, 14, 16, 19, 39- 40, 42-43, and 48-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over LoBianco as applied to claims 1-3 and 7-8 above, and further in view of Distefano (US 6,309,915, previously cited.)

In regard to claims 4, 6, 14, 16, 39-40, 42, and 48-50, LoBianco discloses all of the claimed limitations as mentioned above except the materials of the filler such as silica, metal.

Distefano, in fig. 7, discloses an analogous semiconductor package including a substrate 5, IC die 2 mounted on the substrate, and further discloses filler 3, for example, that comprises highly thermal conductive fillers such as silver, silica, epoxy, etc., in order to prevent the package from overheating since these fillers are highly thermal conductive materials, therefore, heat will be dissipated from the package quickly. See col. 7, line 63- col.8, line 15.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to use fillers as taught by Distefano in order to dissipate heat from the package, therefore, preventing the package from overheating.

In regard to claims 9, 19 and 43, and 51, Distefano further discloses a heat dissipation device 10, heat sink, attached to the package, and in thermal contact with the thermally conductive material, see fig. 4. This heat sink further enhances heat dissipation from the package, and it is very common in the art of semiconductor packaging.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to attach a heat sink to the package as taught by Distefano in order to keep the package under appropriate temperature, and further prevent the package from damage due to overheating.

Response to Arguments

6. Applicant's arguments filed 12/13/04 have been fully considered but they are not persuasive. For instance, Applicants contend that the cited art does not disclose "a

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thermal conductive portion encapsulating substantially all the electrically insulation portion." As mentioned above, element 60 encapsulates the package including insulating portion 64, wires 38 on the substrate 20. The encapsulating portion 60 is made of plastic, which is a thermally conductive material.

Conclusion

7. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathan W. Ha whose telephone number is (571) 272-1707. The examiner can normally be reached on M-TH 8:00-7:00(EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Nathan Ha
March 1, 2005



HOAI PHAM
PRIMARY EXAMINER